

CARBON MONOXIDE MAINTENANCE PROVISIONS

FOR OGDEN CITY

Section IX, Part C.8

Adopted by the Air Quality Board
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SECTION IX.C.8

OGDEN CITY MAINTENANCE PROVISIONS

IX.C.8.a. INTRODUCTION

The State of Utah is requesting federal redesignation of Ogden City from nonattainment to attainment for Carbon Monoxide (CO) under Section 107(d) of the Clean Air Act of 1990 (hereafter referred to as the Act). In accordance with Section 175A of the Act, additions are made herein to the Carbon Monoxide State Implementation Plan (CO SIP) to demonstrate that Ogden City has achieved the National Ambient Air Quality Standard (NAAQS) and can maintain the standard through the year 2007. These additions are hereafter referred to as the "Ogden City Carbon Monoxide Maintenance Plan" which contains the maintenance provisions of the CO SIP.

(1) Background

The federal Clean Air Act requires areas failing to meet the federal ambient CO standard to develop State Implementation Plans (SIPs) with sufficient control requirements to expeditiously attain and maintain the standard. The federal ambient CO standard consists of an eight-hour average standard of 9.0 parts per million (ppm) CO and a one-hour average standard of 35.0 ppm CO. On March 3, 1978, the EPA designated Ogden City as a nonattainment area in accordance with the provisions of Section 107 of the Act based on measured exceedances of the eight-hour standard observed in the nonattainment area. Ogden City has never recorded an exceedance of the 35.0 ppm one hour-average standard.

In response to new siting guidelines published by EPA, a CO monitoring site was established in Ogden City on Washington Boulevard between 2900 and 3000 Street. The data collected at that site was used in determining the 10.5 ppm design value for Ogden City. For the purpose of a SIP, the design value is an ambient pollutant concentration in ppm that has to be reduced to or below the level of the NAAQS with federally enforceable emission reductions. For CO, the design value is computed by taking the highest of the second highest concentrations for the two most recent years of quality assured data.

On November 15, 1990, Congress amended the Clean Air Act which resulted in new requirements for the CO SIP, as well as the designation of Ogden City to a moderate nonattainment level based on monitoring data from 1988-1989.

A violation of the CO NAAQS is defined as more than one exceedance of the CO standard per year per monitoring site. The last violation of the 9.0 ppm eight-hour average CO NAAQS in Ogden City was in 1990. A 14.4 parts per million (ppm) eight-hour average, recorded on January 10, 1990, was the highest CO concentration measured. A second high eight-hour average of 9.9 ppm CO was also recorded on January 10, 1990.

Two complete, consecutive calendar years of quality assured CO ambient monitoring data must show that violations of the CO NAAQS are no longer occurring in order for an area to be redesignated from CO nonattainment to attainment. By January 1, 1993, the State had adequate ambient CO monitoring data to demonstrate attainment of the NAAQS for CO in Ogden City. In addition, EPA has allowed the use of the

most recent eight consecutive quarters of air quality monitoring data to demonstrate attainment for CO in Ogden City. The most recent eight consecutive quarters of CO monitoring data, April 1994 through April 1996, have also been included in this maintenance plan to verify continued attainment for CO in Ogden City.

CO concentrations are typically higher during the months of January, November and December. The “CO season” in Ogden City begins January of any given calendar year. The CO season is then interrupted by the summer months and continues to include November and December of that calendar year.

(2) Maintenance Plan Overview

The Federal Clean Air Act and EPA policy based on the Act require that Maintenance Plans satisfy several prerequisites in order to be federally approvable. Federal approval of the Maintenance Plan is necessary in order to officially redesignate Ogden City as a carbon monoxide attainment area. Table IX.C.37 identifies the prerequisites that must be fulfilled before a maintenance plan can be approved by the Environmental Protection Agency (EPA). Table IX.C.38 identifies the requirements of a maintenance plan.

Table IX.C.37 Prerequisites to Redesignation			
Category	Requirement	Reference	Addressed in Section
Existing Controls	The State must assure that control measures required in past CO SIP revisions have been implemented, and that existing controls will remain in effect after redesignation, unless it has demonstrated to EPA's satisfaction that the standard can be maintained without a specified control which the State may propose to delete.	CAA: Sec. 172(c)(1)	IX.C.8.b(1)
Existing Controls	Areas that were required to implement transportation control measures and/or inspection/maintenance programs must provide evidence that these programs have been fully implemented.	CAA: Sec. 187(a)(4) and Sec 182(a)(2)(B)	IX.C.8.b(2)
Existing Controls	The State must assure that acceptable provisions exist and are being implemented to provide for adequate control of CO emissions in all new source reviews.	CAA: Sec. 172(c)(5)	IX.C.8.b.(3)
Oxygenated Gasoline Program (Waiver requested for Weber	In a CO nonattainment area which is redesignated as attainment for CO, the requirements of this subsection shall remain in effect to the extent such program is necessary to maintain the standard thereafter in the area.	CAA: Sec. 211(m)(6)	IX.C.8.b(5)

Table IX.C.37 Prerequisites to Redesignation			
Category	Requirement	Reference	Addressed in Section
County)			
CO Monitoring	Two complete, consecutive calendar years of quality assured CO monitoring data must show that violations of the standard have not occurred.	CAA: Sec. 107(d)(3) and Calcagni memo Sept. 4, 1992	IX.C.8.c
Verification	Area and mobile source emission data must be examined for evidence of economic downturn that may have contributed to attainment, and if appropriate, the State must assure that economic recovery will not jeopardize continued maintenance of the standard	Federal Reg. Vol 57 No. 74 13563	IX.C.8.d(2)
Verification	The state must verify that the improvement in air quality is due to permanent and enforceable reductions in emissions.	CAA: Sec. 107(d)(3)(e)(iii)	IX.C.8.d(1)(a)

Table IX.C.38 Requirements of a Maintenance Plan			
Category	Requirement	Reference	Addressed in Section
Attainment Emission Inventory	The State can choose to demonstrate maintenance of the NAAQS using an emissions inventory approach. This approach requires the development of an "attainment emission inventory" to identify the level of emissions in the area which is sufficient to attain and maintain the standard.	Calcagni, September 4, 1992, Sec 187(a)(1) and Sec 172(c)(3)	IX.C.8.e
Projected Inventories	Projection inventories must be completed that show the standard can be maintained in the future (i.e., for 10 years after redesignation), especially noting whether future increases in CO emissions are expected and can be accommodated without additional controls, or whether new controls need to be implemented to insure maintenance of the standard.	CAA: Sec. 172(c)(3) and Sec. 175(a)	IX.C.8.f; IX.C.8.g
New emission	The State must ensure that it has legal authority	CAA: Sec.	

Table IX.C.38 Requirements of a Maintenance Plan			
Category	Requirement	Reference	Addressed in Section
controls	to implement and enforce all control measures for which emissions credits are assumed in the projection inventory demonstrating maintenance of attainment.	110(a)(2)(B) and Calcagni memo Sept. 4, 1992	IX.C.8.g
Contingency Measures	Section 175A of the Act requires that areas seeking redesignation from nonattainment to attainment develop contingency measures that include state commitments to implement additional control measures in response to future violations of the NAAQS.	CAA: Sec. 175A and Calcagni memo Sept. 4, 1992	IX.C.8.h
Verification of Continued Maintenance	The maintenance plan must indicate how the state will track the progress of the Maintenance Plan.	CAA: Sec. 172(c)(3), Sec. 187(a)(1) and Sec 187(a)(5)	IX.C.8.i
Periodic Inventory	The CAA requires moderate CO nonattainment areas to submit a periodic inventory no later than September 30, 1995 and no later than the end of each 3-year period thereafter until the area is redesignated to attainment. This inventory must meet all requirements of the attainment inventory. Although the State is not required to submit this inventory for Ogden City the State will use it to track the progress of the maintenance plan.	CAA: Sec. 187(a)(5) and Sec. 187(a)(1)	IX.C.8.i(1)
Conformity	This plan must establish a 20 year budget to be used as a basis for determination of conformity of the Long Range Transportation Plan developed by the Metropolitan Planning Organization.	176(c)	IX.C.8.f(2)

IX.C.8.b EXISTING RULES AND CONTROLS

Requirements Relating to Existing Controls and Regulations:

- *The State must assure that control measures required in past CO SIP revisions have been implemented and that existing reasonably available control technology (RACT) controls will remain in effect after redesignation, unless it has demonstrated to EPA's satisfaction that the standard can be maintained without one or more controls.*

- *Areas that were required to implement transportation control measures and/or inspection/maintenance programs must provide evidence that these programs have been fully implemented.*
- *The State must assure that acceptable provisions exist and are being implemented to provide for new source review.*

(1) Enforcement of Existing CO State Implementation Plan

This SIP revision incorporates federal requirements to demonstrate that the CO standard can be maintained in future years in the Ogden City nonattainment area. The State will continue to enforce the requirements of the existing CO SIP until the redesignation request is approved. The State also certifies that all existing controls required in past CO SIP revisions, and new controls incorporated in these revisions, will remain in effect after redesignation of Ogden City to attainment, unless the State demonstrates to EPA's satisfaction that the standard can be maintained without a specific control which the State may propose to delete.

(2) Assurance That Existing CO and Transportation Control Measures Have Been Fully Implemented

The State certifies that, to the best of its knowledge, carbon monoxide sources covered by an area or mobile source control in the Ogden City nonattainment area are in compliance with state and federal law. All of the programs which were implemented before and during the 1992 attainment year inventory such as basic inspection and maintenance (I/M) are currently required for air quality purposes in the Ogden City nonattainment area. The Federal Motor Vehicle Program and traffic control measures were included in past attainment demonstrations for CO SIP revisions. The State will assure that all of the programs implemented by the CO SIP, including the aforementioned control measures, will be maintained in future years in order to maintain the NAAQS.

(3) Permitting of Existing, New, or Modified Sources

R307-1-3 of the Utah Air Conservation Rules, Control of Installations, specifies state requirements for conducting preconstruction review of new sources and modifications to existing sources. The rule requires all new or modified sources with a potential to emit any type of air pollutant to submit a notice of intent to construct and to obtain a permit or approval order from the State, if necessary, before construction of the source may begin. The permit will require installation of best available control technology. If a new point source were to submit a notice of intent to construct in Ogden City, the general requirements of R307-1-3 would apply as well as all existing and future nonattainment area "new source review" sections contained within R307-1-3.3. On October 4, 1995, a rule change to R307-1-3 was adopted for public comment by the Utah Air Quality Board. This rule change will cause all requirements of R307-1-3 to apply to maintenance areas.

(4) Recent Controls That Contributed to Attainment After the CO SIP was Adopted

Ogden City has been in attainment of the CO NAAQS since January 1, 1991. The last violation in Ogden City was in 1990. This improvement in air quality is the result of the CO SIP, that was adopted in 1984, and additional federal emission control requirements. It is the position of the State that Ogden City did not exceed the CO standard during these years due to a combination of emission reductions resulting

from 1) the implementation the Federal Motor Vehicle Control Program and 2) the implementation of an I/M program in Weber County on January 1, 1992.

Weber County's I/M program was fully implemented on January 1, 1992, in response to the violation of the CO NAAQS in Ogden City in 1990. A legislative mandate required that I/M counties use computerized analyzers, standardize their programs, and provide for reciprocity. Major elements included: the use of BAR90 technology emissions analyzers; the inclusion of vehicles owned by federal agencies, federal employees, and university and college employees and students; an increased failure rate; the exclusive issuance of waivers by I/M technical center staff; a substantial increase in the dollar amount spent on emission-related repairs to qualify for a waiver from previous Utah I/M programs (\$100 for 1980 or older model cars, increased to \$200 for 1981 and newer models); automated data management and audit functions; and inspection of emission control devices by the Weber County anti-tampering program. As a result of separate legislation, the number of vehicles qualifying for exemption from the I/M program in the Wasatch Front because of "farm truck" classification has been reduced. Substantial emission reductions have resulted from the I/M program. The CO reductions in Ogden City due to the I/M program have contributed to attainment of the CO NAAQS. In 1993, the emission reductions due to implementation of the basic I/M program in Ogden City accounted for an emission reduction of approximately 5.25 tons/day of CO, thereby helping Ogden City to attain the NAAQS for CO.

(5) State of Utah Waiver from the Oxygenated Gasoline Program

Ogden City was classified a moderate non-attainment area at the time of the passage of the Clean Air Act Amendments of 1990. The Clean Air Act requires the implementation of an oxygenated fuels program in the entire Metropolitan Statistical Area (MSA) in which some moderate CO nonattainment areas are located, including Ogden City. The oxygenated gasoline program is designed to help those areas with a CO problem to attain the NAAQS by increasing the combustion efficiency of an automobile's engine, thereby decreasing the CO emitted. On March 31, 1993, the State of Utah requested a waiver from the EPA to relinquish the requirement to implement an oxygenated gasoline program in the Salt Lake City/Ogden MSA. Ogden City has been in attainment of the CO NAAQS since 1991, and the State believes that an oxygenated gasoline program is not needed in the Salt Lake City/Ogden MSA, and based on inventory projections an oxygenated gasoline program is not needed in the Salt Lake City/Ogden City MSA through 2007.

IX.C.8.c. CARBON MONOXIDE MONITORING

Requirement Related to CO Monitoring:

- *Two complete, consecutive calendar years of quality assured CO monitoring data must show that violations of the standard are no longer occurring. Because the CO standard allows for 1 measured exceedance per year, a violation of the standard is defined as 2 or more measured exceedances of the 9.0 ppm CO standard at the same monitoring site during a calendar year*

(1) CO Monitoring Network

Technical Support Document, Volume 1 , Tab 1

Information concerning CO monitoring in Utah is included in the Monitoring Network Review. Since the early 1980s, the Monitoring Network Review has been updated annually and submitted to EPA for approval. EPA personnel have concurred with the annual network reviews, and have agreed that the network remains adequate.

EPA regulations for CO monitoring require peak monitoring stations to be located adjacent to most heavily traveled traffic corridors in the urban area. Maximum CO concentrations occur during winter temperature inversions. The existing CO monitoring stations were sited in accordance with the EPA siting requirements.

The annual emissions inventory indicates the amount of CO emissions from different sources along the Wasatch Front. Approximately 85% of the carbon monoxide emitted is generated by vehicles. Figure IX.C.27 illustrates the distribution of annual and daily CO emissions in Ogden City for 1992. The current CO monitoring network is designed primarily to monitor the impact from mobile sources since most of the CO can be attributed to mobile sources. Figure IX.C.28 is a graph of the history of CO high and second-high 8-hour average concentrations and exceedances from 1982 through 1994.

When Utah's CO network was originally designed, no modeling data was available to assist in site location, and sites were chosen based on traffic volumes and patterns. The peak CO site in Ogden City was originally located based on traffic information obtained from the Utah Department of Transportation. From January 22 through 25, 1992, a CO saturation study was performed in the Ogden City/Weber County area. The emphasis of the study was to verify that the existing CO monitoring station was located in an area representative of high CO concentrations. The study verified the original site selection, and indicated that the existing CO monitoring station is appropriately located. The information from the saturation study was also used in selecting the location for the new CO monitoring site.

CO monitoring data has been collected at the following locations in Ogden City:

- Ogden Station (AIRS # 49-057-0001) collected CO data from February 1971 to May 1984. This was a middle-scale station located at 2570 Grant Avenue and was not a peak site. (Middle-scale defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.)

- Washington Boulevard Station #1 (AIRS # 49-057-0005) collected CO data from July 1982 to April 1993. This was a micro-scale station located at 2955 Washington Boulevard Street. (Micro-scale defines the concentration in air volumes associated with area dimensions ranging from several meters up to 100 meters) This is one of the areas identified by the CO saturation study as being representative of high CO concentrations.
- Washington Boulevard Station #2 (AIRS # 49-057-0006) started collecting CO data April 1994. This is a micro-scale station located at 2540 Washington Boulevard. This is one of the areas identified by the CO saturation study as being representative of highest CO concentrations. This monitor was installed on April 19, 1994. Site selection for this monitor began in April 1993 but complications on other selected sites required the selection of this location.

Figure IX.C.29 is a map of the existing Ogden City CO nonattainment area that shows the location of the original monitoring site and the current monitoring site. A site description inventory report from the AIRS data base, and the CO design criteria for SLAMS is included in the TSD.

(2) Ambient CO Monitoring Data

Each monitoring site is allowed one exceedance of the standard in a single calendar year. Two or more exceedances in a single calendar year is a violation. The entire CO planning area is considered to be in violation of the standard if a single monitor records more than one exceedance in a single calendar year.

All of the monitoring data is contained in the Aerometric Information and Retrieval System (AIRS). All CO monitoring data has been collected in accordance with the requirements contained in 40 CFR, Part 58, Appendix A, C, and E. A list of measured exceedances of the 9.0 ppm standard recorded in Ogden City during the years 1986 through 1994 is included in the associated technical support document.

Figure IX.C.31 visually documents the number of measured exceedances at the CO monitor in the Ogden City nonattainment area from 1970 to 1994.

(3) Exceedances of the CO Standard

Beginning with the second quarter 1990 through the end of the first quarter of 1993, 12 consecutive quarters of CO data were collected at the Washington Boulevard Station #1 that did not record any exceedances or violations of the NAAQS for CO. The lease was lost for that station and after a one year break in the data record, data collection began at the new station. Since data collection began at the new Washington Boulevard #2 monitoring station, six consecutive quarters of data have been collected that do not show an exceedance or violation of the NAAQS. The data record for Ogden City shows 18 quarters of data without an exceedance or violation of the NAAQS. The data record shows that the CO standard was attained by December 31, 1992, with no subsequent violations or exceedances.

In addition to recorded exceedances of the CO standard, EPA looks at the quantity of "missing" monitoring data in evaluating an area's CO attainment status. Missing data can occur when a monitor is being repaired, calibrated, or is malfunctioning, leaving a time gap in the monitored readings. EPA discounts these gaps if data capture for each calendar quarter is 75% or more.

EPA allows one measured exceedance per calendar year, per monitoring site. For CO non-attainment areas, if the total data capture is less than 75% during a calendar quarter, the impact of the missing data on the attainment status of that area must be negotiated with EPA.

To determine whether the 75% data capture requirement for ambient monitoring was met, the State relied on the AIRS Data Completeness Report AMP 430 for the period 1990 through 1994. Monitored CO data for 1991 and 1992 support the State's redesignation request. Since the time that this redesignation request was initiated, monitoring data for the period of April 1994 through April 1996 have been added to support the State's redesignation request.

(4) Missing Data

The building that housed the Washington Boulevard #1 site was scheduled to be demolished by the property owner early in 1993. DAQ was told that the lease was terminated and the monitoring equipment was to be removed as quickly as possible. On April 6, 1993, the CO monitor was shut down and removed. The selection process for a new CO site began prior to the closing of the Washington Boulevard #1 site. Discussions with several property owners and Ogden City prolonged the site selection process. A location for a new micro-scale CO monitoring site was finally secured in a state-owned office building. Data collection began at this new site on April 19, 1994. The result of the long site selection process was the loss of CO data in Ogden City for the 1993-94 winter season. This data loss disrupted a continuous attainment demonstration that started in 1991. The data loss does not invalidate the State's position that Ogden City has attained the CO NAAQS.

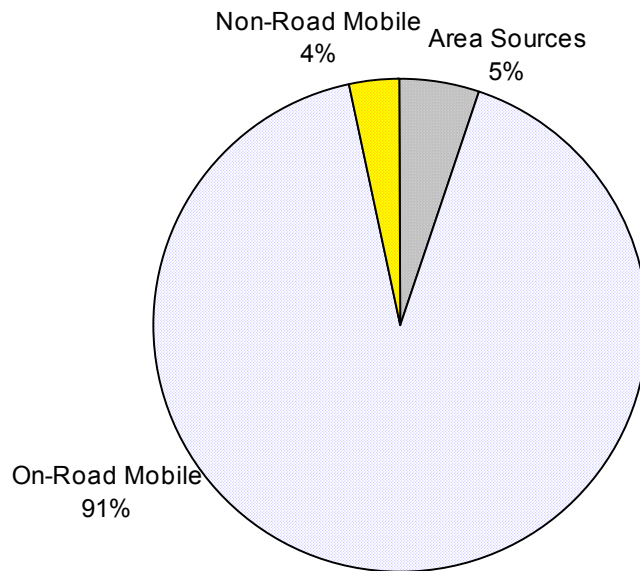
Since the CO emissions inventory for Ogden City indicates a total decrease in CO emissions during this period of data loss, the actual CO concentrations in Ogden City would probably not have exceeded the standard during this period. (See table IX.C.42) The meteorological analysis in Section IX.C.8.d (1) (b), further substantiates the States position that the missing CO monitoring data, from the years 1993 and 1994 would not have exceeded or violated the CO standard and therefore, does not invalidate this redesignation request.

(5) Ongoing Review of Monitoring Sites

Following the redesignation of Ogden City to attainment for CO, the State commits to continue operating the existing CO monitoring site according to all applicable federal regulations and guidelines. The State will reevaluate the site location annually to determine whether new monitoring sites are needed or whether existing monitoring sites should be removed or relocated.

Figure IX.C.27

1992 - Distribution of Annual CO Emissions - Ogden City



1992 - Distribution of Daily CO Emissions - Ogden City

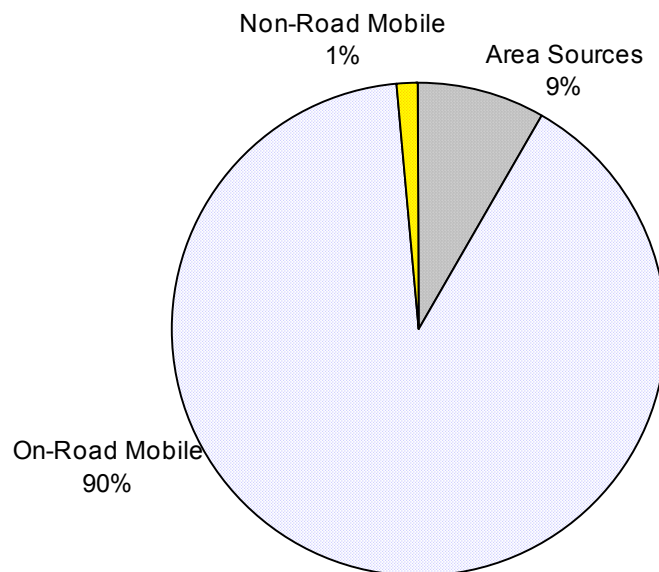


Figure IX.C.28

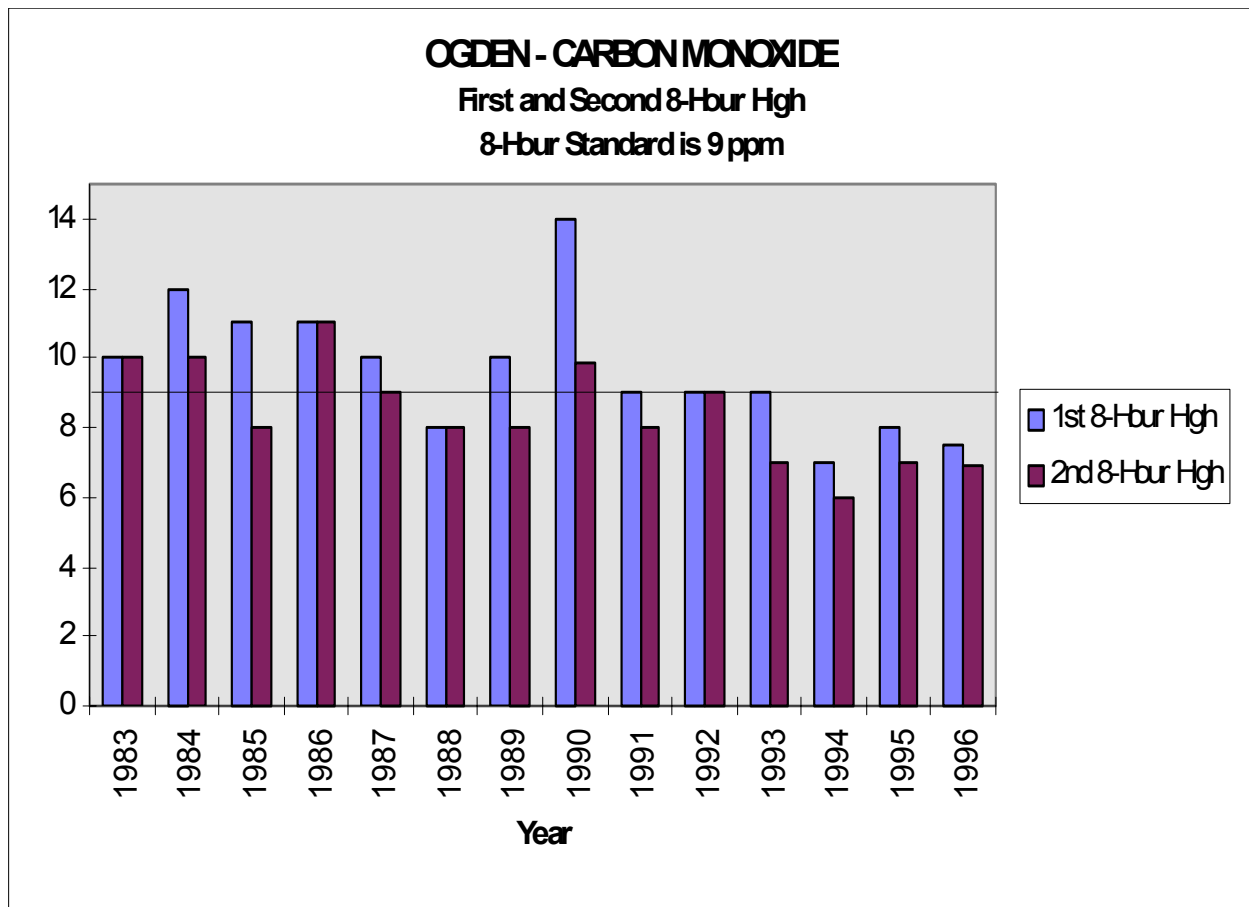


Figure IX.C.29

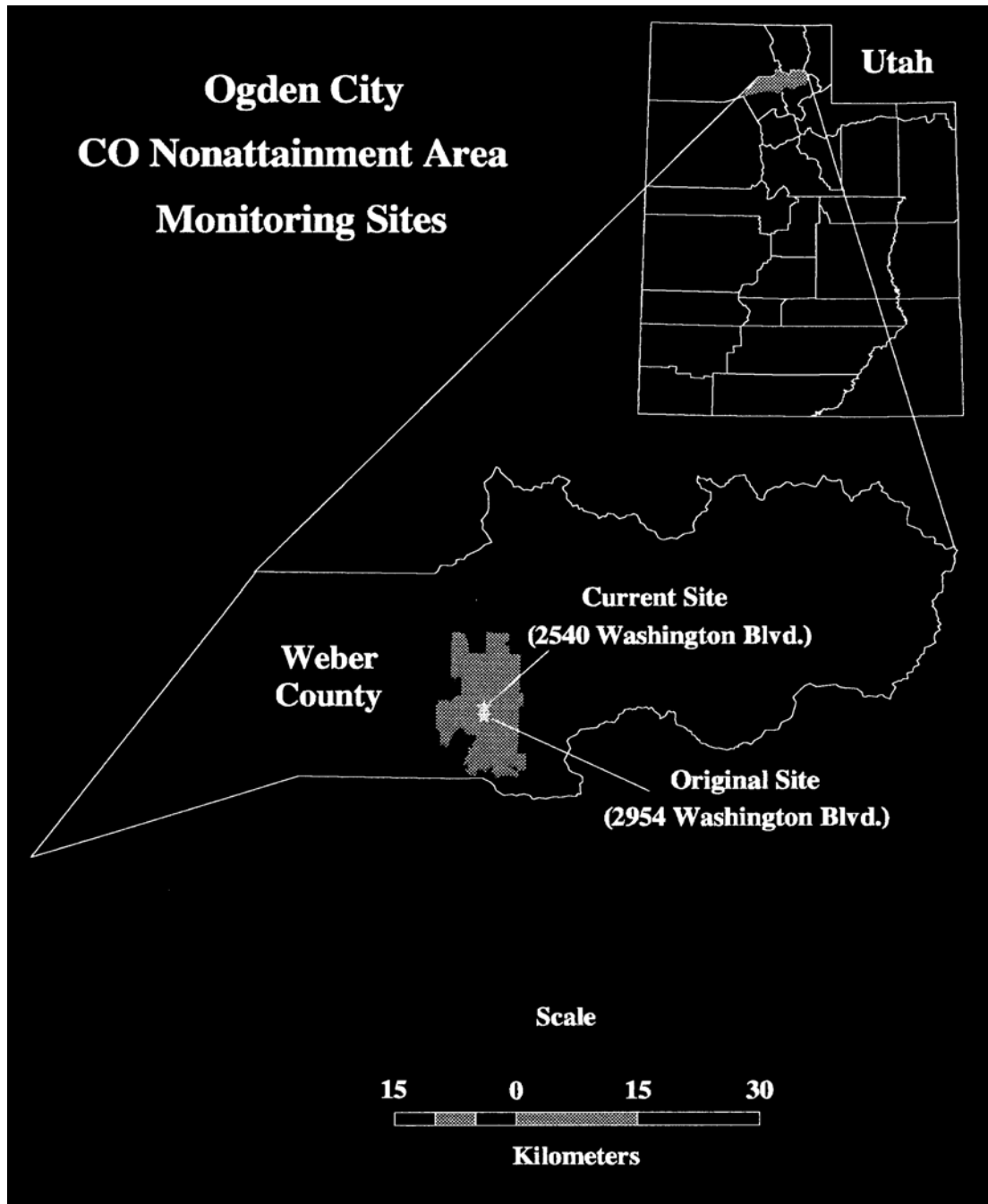


Figure XI.C.30

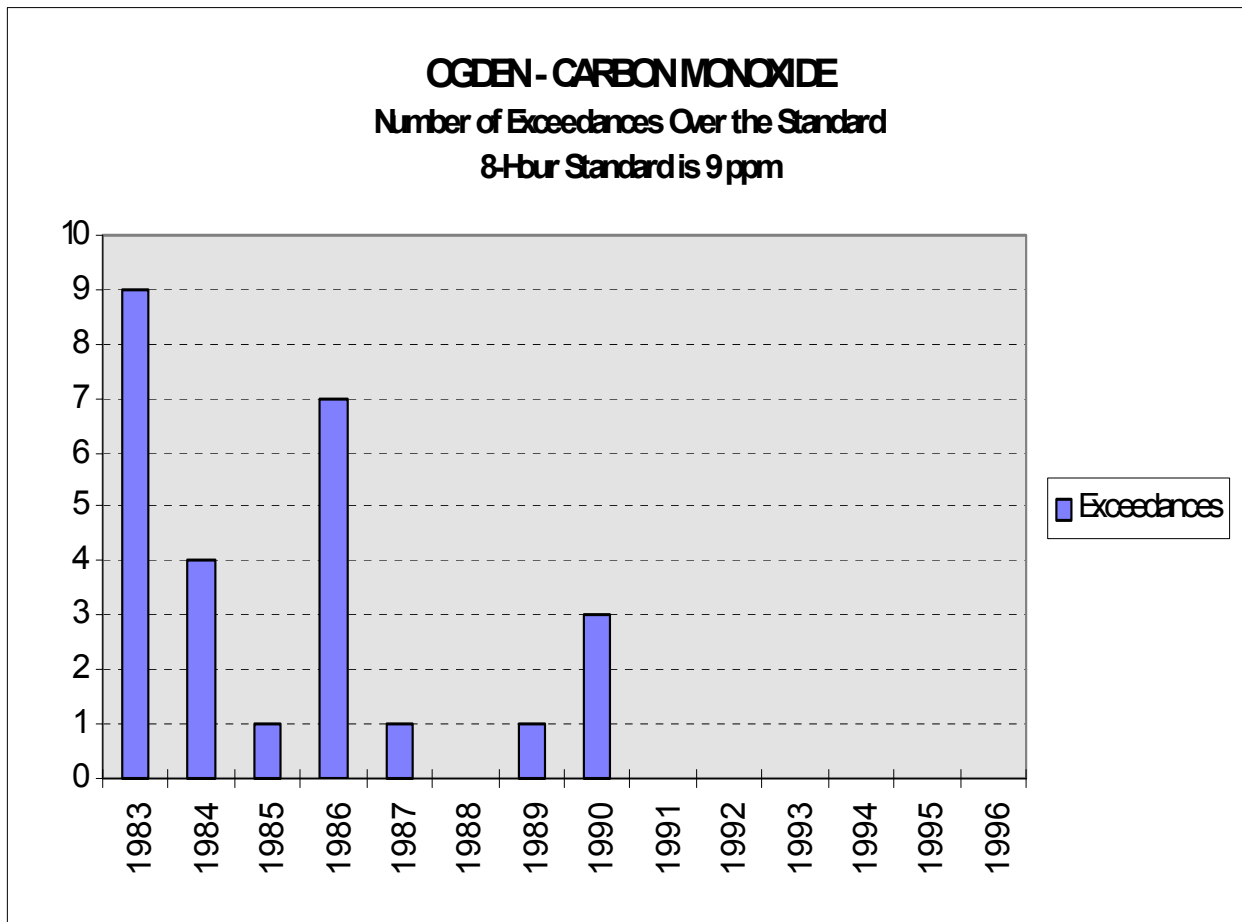
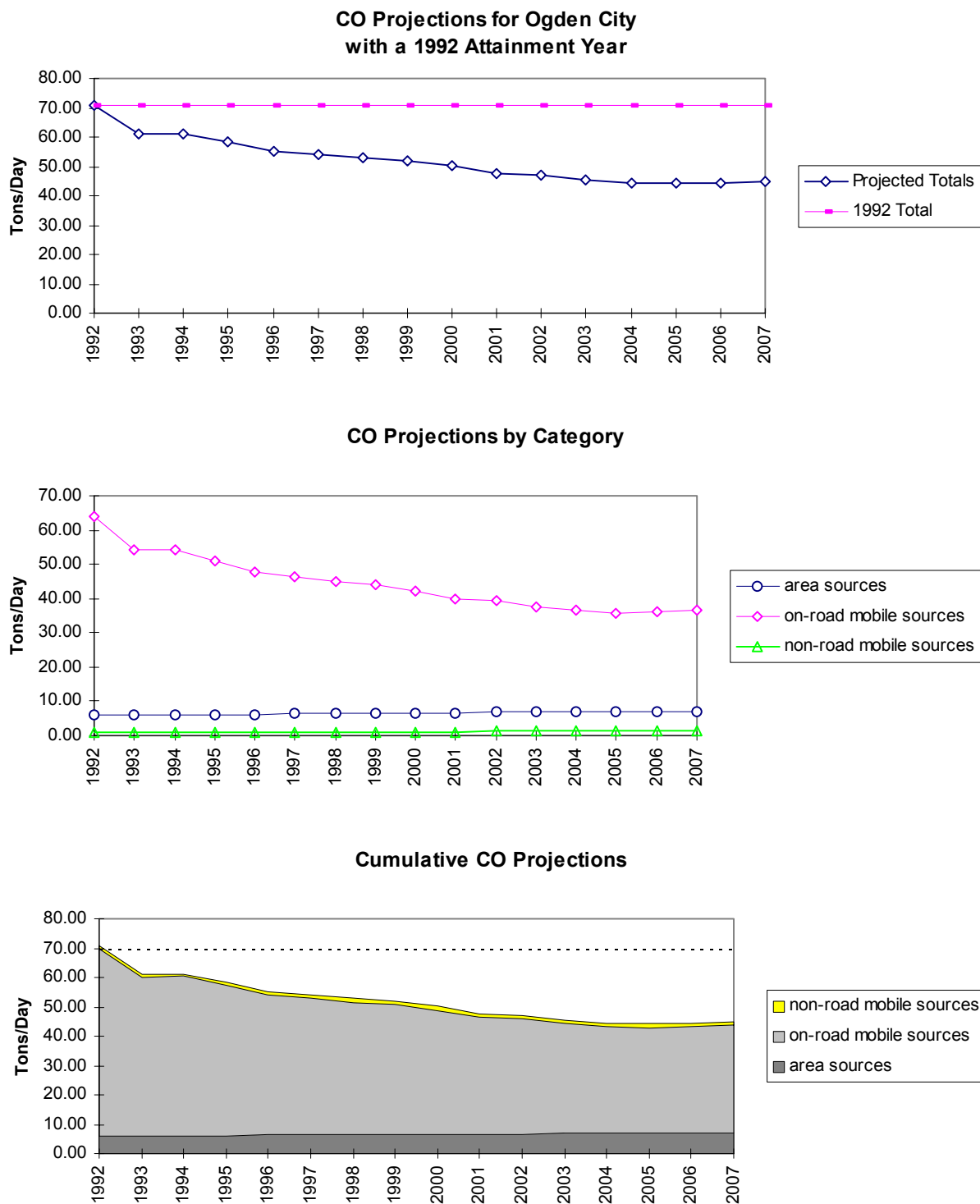


Figure IX.C.31



IX.C.8.d VERIFICATION OF AIR QUALITY IMPROVEMENTS

Requirements Related to Verification of Air Quality Improvements:

- *The state must verify that the improvement in air quality is due to permanent and enforceable reductions in emissions.*
- *Area and mobile source emission data must be examined for evidence of economic downturn that may have contributed to attainment, and if appropriate, the State must assure that recovery from the downturn will not jeopardize continued maintenance of the standard*

(1) Demonstration that Air Quality Improvements Are Permanent and Enforceable

(a) Enforceable Emission Reductions

The improvement in air quality already achieved in Ogden City has resulted from implementation of the emission controls listed below. Because these controls have been federally approved the resulting CO emission reductions are federally enforceable. This plan includes a state commitment to continue to enforce all applicable requirements of past revisions to the State Implementation Plan, even after the Ogden City area is redesignated to attainment. This commitment, detailed in Section IX.C.4, makes permanent the emission reductions achieved from these requirements. The emission impacts of the controls listed below have been accounted for in completing the CO emission inventories for these maintenance provisions to the SIP.

- 1) The Federal Motor Vehicle Emission Control Program.
- 2) Basic I/M Program with improvements.

A continued improvement in air quality through the year 2007 for Ogden City will result from continuing the federal emission controls listed above. These federal control requirements will produce CO emission reductions that are permanent and federally enforceable. Items 1 and 2 above have been implemented in Ogden City and are discussed in greater detail in Section IX.C.4.

(b) Meteorology and Ambient Concentration

Technical Support Document, Volume I, Tab 2

For redesignation of the Ogden City CO nonattainment area to attainment, it is necessary to demonstrate that reductions in ambient CO concentrations are the result of permanently enforceable emissions reductions, and not the result of yearly variations in meteorological conditions. This section will illustrate that the air pollution potential for Ogden City continues to exist due to the ongoing presence of stagnation periods (inversions) prevalent to this area. For reference, the 'violation' years and 'non-violation' years for CO in Ogden City are:

Violation Years - 1986 and 1990

Non-Violation Years - 1985, 1987 through 1989, and 1991 through 1994

The air-pollution potential of an area is directly related to two variables: 1) the vertical diffusion of pollutants (the mixing depth), and 2) the wind speed in this mixing depth, which result in horizontal transport of pollutants. For the State to quantitatively assess these variables in Utah valleys and mountains, an Air Stagnation Index has been developed. These are numerical, non-dimensional values ranging from less than 50 during the worst stagnant conditions to more than 1000 during least stagnant conditions. The Air Stagnation Index is calculated as follows:

$$\text{Air Stagnation Index} = (\text{Surface Wind Speed (knots)}) \times \text{Mixing Height (feet)} / 100$$

In Utah, the worst stagnation occurs for prolonged periods with stationary high pressure, both at the surface and aloft, mainly during the months of November through March. Cold air trapped in valleys, combined with low sun angle and snow cover, results in strong surface inversions. Warm air advection, associated with the high pressure aloft, strengthens the stable conditions at the surface. This stable layer is generally confined to below 6,000 feet above sea level. The depth of the Wasatch Front valley averages around 5000 feet, with the valley floor elevation at about 4500 feet, and the top of the Wasatch Mountains and Oquirrh Mountains ranges at about 9500 ft. Under these conditions, diurnal heating cannot breakup the stable layer. As a result, pollutants are trapped in the shallow mixing depth from the surface to 6,000 feet above sea level, and are unable to mix with clean air above.

Surface winds, largely controlled by local topography rather than pressure gradients, are very light, and often show a diurnal reversal (mid-day shift in wind direction), limiting any horizontal transport which would result in air cleansing. At the same time, elevations above 6500 feet often have good ventilation due to warm advection, resulting in mild temperatures and deep mixing depths. Valley air stagnation indexes frequently drop below 150, while air stagnation indexes at higher elevations may be 600 or greater.

Upper-air (radiosonde) data of the vertical structure of winds, temperature, and humidity are the primary source of specific data used in determining daily air stagnation indexes for Ogden City. Radiosondes are released twice daily by the National Weather Service at the Salt Lake City International Airport, 30 miles south of Ogden City. Actual daily ASI values recorded by the National Weather Service at the Salt Lake City Airport for the period January, 1985 through March, 1995 can be found in the Technical Support Documentation.

As shown in Table IX.C.39 below, exceedances of the 8-hour National Ambient Air Quality Standards for CO occur during high or moderate stagnation periods with very low ASI values (100 or less). Surface temperatures associated with these periods are within the normal range of winter day-time highs and night-time lows. The values contained in this table were taken from National Weather Service data collected at the Salt Lake City airport and Utah Division of Air Quality monitoring records. They indicate the date, time, location, monitored concentration, actual air stagnation indexes, and the average 8-hour wind speed and temperature, during CO violations recorded in Ogden City for the time period November, 1985 through March, 1995.

TABLE IX.C.39: Monitored Carbon Monoxide Violations (8-hr avg.) and Air Stagnation Indexes for Ogden City from 1985 through 1994.

Monitor Site	High	Date	Hour	Monitored Conc. (ppm)	Air Stagnation Index	Wind Sp. (m/s)	Temp. EF ^a
1985 - None							
1986							
Washington Blvd., Ogden	1st	01/04/86	0000	10.7	50	2.1	22
	2nd	12/20/86	0000	11.2	40	2.0	28
1987 Through 1989 - None							
1990							
Washington Blvd., Ogden	1st	01/10/90	1600	9.9	100	2.5	41
	2nd	01/10/90	1900	14.4	100	2.5	43
1991 Through 1994 - None							

a - Data recorded by National Weather Service

Table IX.C.40 indicates the number of days with air stagnation indexes equal to or below 150 recorded for violation and non-violation years during the period 1985 through 1995. A yearly breakdown of this table appears in the Technical Support Document.

Three inversion episodes during 1991, 1992, and 1993 (non-violation years) were reviewed for similarity with the four exceedance episodes which occurred during 1986 and 1990 (see Table IX.C.39). Monitors in Salt Lake and Weber Counties recorded CO concentrations and wind speed data for the following inversion episodes:

February 1 through February 8, 1991

January 25 through January 30, 1992

January 14 through January 16, 1993

Monitored CO concentrations, wind speeds, and air stagnation index values for these periods appear in the Technical Support Document. Using the daily air stagnation index value and the 8-hour average wind speed, the average mixing height can be expressed as:

$$\text{Mixing Height (feet)} = \text{Air Stagnation Index} \times 100 / \text{8-hour Average Wind Speed (knots)}.$$

Accordingly, the average mixing height during the four exceedance periods listed in Table IX.C.39 above ranged from approximately 1000 ft with an air stagnation index equal to 40, to 2000 ft with an air stagnation index equal to 100 (see Technical Support Document). The length, height and orientation of the Wasatch Mountains combine to force the natural eastward flow of air into north and south flow patterns. Colder trapped air and pollutants are forced against the east range, and are unable to lift the

additional 3000+ feet or more that is required to move this air into the predominantly eastward wind-flow field aloft.

Using the average daily air stagnation indexes and average wind speeds from the 1991, 1992, and 1993 inversion episodes, the average mixing heights during these periods were 525, 1020, and 531 feet, respectively. Daily mixing layer depths during the 1991 episode varied from 152 ft up to 940 ft, depending on the daily air stagnation index, and the location of the wind speed monitor. Mixing layer depths during the 1992 episode varied from 551 feet up to 2345 feet. Mixing layer depths during the 1993 episode varied from 138 feet up to 985 feet. Since the air stagnation index values are calculated from afternoon radiosonde data (period of maximum warming from solar radiation), it can be reasonably assumed that these values closely represent the maximum mixing height for the day. Other hours of the day would experience mixing heights less than those listed above.

TABLE IX.C.40 Number of Periods with Air Stagnation Index Values less than 150 During Violation and Non-Violation Years

Level of Stagnation	Total # of Days During Violation Years	Average # of Days During Violation Years	Total # of Days During Non-Violation Years	Average # of Days During Non-Violation Years
Ogden City				
Strong (Air Stagnation Index = 0-50)	34	17	131	16
Moderate (Air Stagnation Index = 51-100)	42	21	202	25
Weak (Air Stagnation Index = 101-150)	23	11	124	16

Inversion episode wind data for each period does not indicate any prolonged periods of high wind speed (> 10 m/s) required to significantly mix the stagnated air. Monitored 8-hour CO concentrations do appear to fall off slightly (down to the 1-3 ppm range) during short periods where wind speeds average 6 to 8 m/s; However, the 8-hour average concentrations quickly return to the 3-6 ppm range after these winds subside. The monitored 8-hour CO concentrations during the 1991 inversion episode were in the 2 to 6 ppm range an average of 96% of the time, with the highest reported 8-hour concentration being 6.8 ppm for Ogden City. The monitored 8-hour CO concentrations during the 1992 inversion episode were in the 2 to 6 ppm range an average of 81% of the time, with the highest reported 8-hour concentration being 8.8 ppm for Ogden City. The monitored 8-hour CO concentrations during the 1993 inversion episode were in the 2 to 6 ppm range an average of 71% of the time, with the highest reported 8-hour concentration being 8.6 ppm for Ogden City.

The average wind speed during the 1991, 1992, and 1993 inversion episodes were 2.7, 2.6, and 3.5 m/s, respectively. The 8-hour average wind speeds during these same episode periods were as low as 0.4 m/s, and as high as 6.7 m/s. The average wind speeds during the four CO exceedance episodes ranged from 2.0

to 2.5 m/s. A time-weighted percentage of monitored wind speeds for the three inversion periods appears in the Technical Support Document.

After a careful review of the meteorology in Ogden City area during the past 10 years, it has been concluded that this area continues to experience significant wintertime inversion periods. These periods are equal in severity and frequency to that which occurred during 1986 and 1990, but without violations of the CO standard. Similar low mixing heights, low wind speeds, and temperatures which were observed during each violation period occurred during the three episode periods in 1991 - 1993. The State, therefore, suggests that meteorological variables did not significantly influence the reduction in ambient CO concentrations in Ogden City. This position is further substantiated by information and analyses contained in the Technical Support Document.

A 5 day inversion episode during 1994 (non-violation year) was reviewed for similarity with the four exceedance episodes which occurred during 1986 and 1990 (see Section IX.C.8.d(1)(b) - Table IX.C.39). Monitors in Ogden City recorded CO concentrations and wind speed data for the following inversion episode:

December 21 through December 25, 1994

Monitored CO concentrations, wind speeds, and ASI values for this period appear in the Technical Support Document. Using the daily ASI value and the average wind speed, the average mixing height were calculated for each day. Accordingly, the average mixing height during the four exceedance periods listed in Section IX.C.8.d(1)(b) - Table IX.C.39 ranged from approximately 1000 ft with an ASI equal to 40, to 2000 ft with an ASI equal to 100 (see Technical Support Document).

Using the average daily ASIs and average wind speeds from the 1994 inversion episode, the average mixing heights during inversion days for this period was 709 feet. Daily mixing layer depths during the 1994 episode varied from 182 ft up to 1474 ft, depending on the daily ASI, and the average wind speed. Since the ASI values are calculated from afternoon radiosonde data (period of maximum warming from solar radiation), it can be reasonably assumed that these values closely represent the maximum mixing height for the day. Other hours of the day would experience mixing heights less than those listed above, thereby reducing the total volume of air throughout which the pollutant is allowed to disperse. This is most evident in the CO monitoring data for late evening and overnight periods. CO concentrations during these periods continue to rise even though the majority of industrial sources and vehicular traffic seen during daytime periods are not operating.

Inversion episode wind data for the 1994 period does not indicate any prolonged periods of high wind speed (> 10 m/s) required to significantly mix the stagnated air, and wind speeds greater than 5 m/s are nonexistent. The average wind speed during the 1994 inversion episode was 2.9 m/s, with average wind speeds ranging between 0.9 m/s, and 5.3 m/s.

After a careful review of the meteorology in the Ogden City area during the winter CO period 1994-95, it has been concluded that this area continues to experience significant wintertime inversion periods. These periods are equal in severity and frequency to that which occurred during 1986 and 1990, but without violations of the CO standard. Similar low mixing heights, low wind speeds, and temperatures which were observed during each violation period occurred during the four episode periods in 1991 - 1994. The State, therefore, continues to suggest that meteorological variables did not significantly influence the reduction in

ambient CO concentrations in Ogden City. This position is further substantiated by information and analyses contained in the Technical Support Document.

(2) Assurance that Baseline Point Source Emission Data Have Not been Influenced by Temporary Economic Downturn

Technical Support Document, Volume I, Tab 3

The State of Utah, Governor's Office of Planning and Budget has verified that Ogden City has not experienced an economic downturn during the 1990's. In fact, analyses have shown that Ogden City has been experiencing robust economic growth during the 1990's.

IX.C.8.e. ATTAINMENT EMISSION INVENTORY - 1992

Requirements relating to Attainment Emission Inventory:

- *The State can choose to demonstrate maintenance of the NAAQS using an emissions inventory approach. This approach requires the development of an "attainment emission inventory" to identify the level of emissions in the area which is sufficient to attain and maintain the standard.*
- *The attainment emission inventory should be consistent with the Utah Emissions Inventory Preparation Plan and EPA guidance. The attainment emission inventory should include emissions during the time period associated with the monitoring data showing attainment.*

The 1992 attainment emissions inventory was prepared using the methodology that had been used for the 1990 base year inventory. The emissions inventory is divided into three major sections: point sources, area sources, and mobile sources. A discussion of each of these three sections follows. Summary tables, showing peak CO daily emissions in tons/day for Ogden City is included as Table IX.C.41.

(1) Point Source Emissions Inventory

Technical Support Document, Volume II, Tab 7

No major (>100 tons per year) stationary sources of CO operated in Ogden City in 1992.

(2) Area Source Emissions Inventory

Technical Support Document, Volume II, Tab 5

The area source inventory accounts for CO emissions at all stationary source locations emitting less than 100 TPY within Ogden. All emission estimates in the area source inventory were reported in tons per CO season day to reflect conditions most typical of higher CO concentrations.

In compliance with EPA guidance, emission estimates for area sources covered by existing rules were adjusted to reflect a rule effectiveness factor of no greater than 80%.

(3) Mobile Sources Emissions Inventory

Technical Support Document, Volume II, Tab 6

Mobile sources are divided into two categories: on-road and non-road sources. On-road mobile sources include automobiles, light-duty and heavy-duty trucks, and motorcycles designed for travel on established federal, state, or local roads. Calculated emissions from these vehicles are in the form of tailpipe exhaust. Rule effectiveness (RE) factors for on-road mobile sources are built-in to the MOBILE5A files and are reflected as settings within the body of the MOBILE5A input files.

Non-road mobile sources include the operation of railroad locomotives, airplanes, and recreational, construction, lawn and garden, and any other portable petroleum-fueled equipment.

(a) On-Road Emissions

The on-road emissions inventory was generated by combining CO emission factors with estimates of average annual and winter weekday vehicle miles of travel (VMT) within Ogden City. All emission estimates in the mobile source inventory were reported in tons of pollutant per peak carbon monoxide season day, per average day, and per average year.

The emission factors were derived from the EPA's mobile sources computer model, MOBILE5A, which provides emission factors for active and passive aspects of vehicle emissions including engine block cooling, and tailpipe exhaust. MOBILE5A incorporates the current federal tailpipe standards as well as those required in the Act, and allows users to input local parameters for vehicle control programs already in place or planned for the future. All MOBILE5A parameters involving inspection and maintenance (I/M) and the anti-tampering program were measured, estimated, or confirmed by the Weber County Health Department, which oversees these programs in Ogden City.

In February 1994, Utah Department of Transportation (UDOT) issued a report entitled *1992 VMT by County, City and Functional Class*. This summary report, which tabulates actual VMT in average annual daily traffic, uses the Highway Performance Monitoring System (HPMS) database and itemizes VMTs occurring on each of 12 functional roadway classes in each city and county within the state. In order to be consistent with Wasatch Front Regional Council's (WFRC) roadway classes (utilized later in the Projections Inventory) which are based on lane number rather than functional use, UDOT's twelve classes were summarized and reassigned into three classes: freeway, arterial & collector, and local roads. The annual average daily VMT were adjusted to typical winter weekday VMT using conversion factors provided by the WFRC. The conversion factors and methods are explained in the TSD for on-road mobile sources.

Since the HPMS model does not attempt to estimate vehicle speeds, the WFRC supplied vehicle speed estimates for 1992 using recent population, employment, travel, and congestion measurements and projections.

The on-road mobile attainment level of 63.93 tons/winter weekday CO is shown in table IX.C.41 (on page 140). The on-road mobile emissions portion of the 1992 CO Attainment Inventory for both a typical winter weekday and an average annual day is included in the TSD.

(b) Non-Road Emissions

Non-road mobile sources include trains, airplanes, recreational, construction, yard care and snow removal, and any other non-road petroleum-fueled vehicle or equipment.

(i) Trains

The two railroad companies operating within Ogden City submitted reports of their 1990 and 1993 train activities, and 1992 activity was interpolated. Line-haul activity was reported in terms of fuel usage and yard activity was reported in terms of number of yard trains. These data were combined with emission factors published in EPA's *"Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources"* (EPA-450/4-81-026d revised) to estimate peak CO winter day emissions.

(ii) Aircraft

The Wasatch Front Regional Council (WFRC) studied the flight activity at the Ogden-Hinckley Airport, the only airport in Ogden. Their report declared 1992 aircraft operations counted daily at the airport's control tower. Emission factors from the EPA's FAEED software package were applied to annual and seasonal flights and the results were summed to produce 1992 annual and winter day emissions.

(iii) Other Non-Road Engines

This section includes the emissions from non-road engines other than aircraft and trains. It covers equipment and vehicles used for winter recreation, construction, snow removal, airport service, and all other miscellaneous non-road engines and vehicles.

Energy and Environmental Analysis Inc (EEA) studied the 1990 pollution burden from non-road engines in 33 nonattainment areas nationwide including Weber County. As part of their multi-city study, EEA examined public, commercial, and industrial records detailing the manufacturing and marketing of seventy-nine categories of non-road equipment. Many of these records were confidential industrial records not open to state or local review. With their broad access to such private and restricted data, DAQ could not improve on EEA's methods or conclusions. DAQ accepted EEA's 1990 report of Weber County.

Emissions for the 1992 Ogden nonattainment area were derived from the EEA 1990 Weber County study by multiplying the per-capita emissions from the use of this collective body of equipment by Ogden's 1992 human population as reported in the publication "*Surveillance Of Socio-Economic Characteristics, 1993 Supplement*."

Table IX.C.41
Ogden City 1992 CO Attainment Inventory

		CO Emissions	
Area Sources		Tons/Yr	Tons/Winter Day
	Orchard Heaters	n/d	n/d
	Woodburning/ Fireplaces	946.99	5.50
	Coal - Residential	6.43	0.03
	Coal - Commercial	0.71	0.00
	Coal - Industrial	27.59	0.11
Stationary	Nat'l Gas - Residential	34.19	0.13
External	Nat'l Gas - Commercial	10.07	0.04
Combustion	Nat'l Gas - Industrial	0.00	0.00
	Fuel Oil - Residential	0.56	0.00
	Fuel Oil - Commercial	0.77	0.00
	Fuel Oil - Industrial	9.08	0.04
Incineration		32.82	0.09
Forest Fires		10.97	n/d
Firefighting Training		neg.	neg.
Structural Fires		0.08	0.00
Prescribed/Slash/Agricultural Burning		n/d	n/d
Open Burning		0.73	n/d
Detonation		n/d	n/d
Aircraft/Rocket Engine Firing & Testing		2.94	0.01
Charcoal Grilling		n/i	n/i
	<i>Total Area Sources</i>	<i>1083.92</i>	<i>5.96</i>
Mobile Sources			
On-Road		18301.90	63.93
Non-Road	Aircraft	295.76	0.56
Mobile	Railroad Locomotives	18.16	0.05
Class	Miscellaneous Non-road Equipment	361.97	0.32
	<i>Total Non-Road Mobile</i>	<i>675.89</i>	<i>0.93</i>
Point Sources		n/d	n/d
	<i>Total Ogden Emissions</i>	<i>20061.71</i>	<i>70.82</i>

Note: Numbers May vary slightly from report due to rounding.

Numbers may not add due to rounding.

n/d = negative declaration

n/i = no information currently available

neg. = negligible amount

pt/s = reported as point source

IX.C.8.f FUTURE AIR QUALITY PROJECTIONS

(1) Projected Emission Inventory, 1992 - 2007

Requirement Relating to Projected Inventories:

- *Projection inventories must be completed that show the standard can be maintained in the future (i.e., for ten years after redesignation), especially noting whether future increases in CO emissions are expected and can be accommodated without additional controls, or whether new controls need to be implemented to insure maintenance of the standard.*

The attainment emission inventory reported above in Section IX.C.8.e documents a level of emissions in Ogden City which is sufficient to maintain the NAAQS for CO. Emissions projections for each source category are used to determine if expected emission levels in future years will exceed the 1992 attainment emission inventory level. Maintenance of the NAAQS is demonstrated if the projected emissions remain below the 1992 level.

The projection emissions inventory is divided into three major sections: point sources, area sources, and mobile sources. A discussion of how emissions were projected for each of these three sections follows. Figure IX.C.31 graphically demonstrates that the emission inventory remains below the 1992 level through the year 2007. A summary table, showing peak CO season (winter) daily emissions in tons/day, is included as Table IX.C.41.

(a) Point Sources

Technical Support Document, Volume III, Tab 7

No major (>100 tons per year) stationary CO sources operated in Ogden City in the attainment year, 1992.

Similarly, no major stationary CO sources are included in the projection inventory from 1992 through 2007. Any new stationary CO source constructed in Ogden City during the projection period must first comply with the general requirements of R307-1-3, which would require obtaining a permit from the State, installing best available control technology and in some cases assessing impacts on the airshed through dispersion modeling. Currently, R307-1-3 does not apply to maintenance areas; however, on December 6, 1995, the Utah Air Quality Board approved amendment of R307-1-3 to include maintenance areas.

(b) Area Sources

Technical Support Document, Volume III, Tab 5

Annual and daily trends for estimating future emissions were based on population and industrial employment growth derived from two documents published by the Office of Planning and Budget: *State of Utah Economic & Demographic Projections, 1994*, and *State of Utah Population Projections For Cities, 1994*. The use of these documents conforms with EPA guidance on preparing area source inventories for CO planning.

(c) Mobile Sources

Technical Support Document, Volume III, Tab 6

(I) On-Road Emissions

The on-road projected emissions were generated by combining CO emission factors with estimates of average annual and winter weekday vehicle miles of travel (VMT) within Ogden City. All emission estimates in the mobile source inventory were reported in tons of pollutant per peak CO winter day, per average day, and an annual total.

The emission factors were derived from the EPA's mobile sources computer model, MOBILE5A, which provides emission factors for active and passive aspects of vehicle ownership including engine block cooling, and tailpipe exhaust. MOBILE5A incorporates the current federal tailpipe standards as well as those required in the Act, and allows users to input local parameters for vehicle control programs already in place or planned for the future. In the absence of knowing the actual post-1995 vehicle I/M program to be implemented, Weber County's Basic I/M program currently in use is reflected in the inventory as a minimum target. The details surrounding the final I/M program will be made by the Weber County Health Department.

The Wasatch Front Regional Council (WFRC) is the officially-recognized metropolitan planning organization for the Ogden City nonattainment area, and the preferred source for estimating future VMT and speeds. The WFRC provided 1990 through 2015 VMT estimates, using a full array of local activity conditions including their knowledge of current and upcoming roadway improvement projects, land-use planning policies, historic vehicle movement data, population and employment distributions, and other demographic statistics. The VMT and speed estimates were furnished within the context of two future scenarios: the "build" and "no-build" of WFRC's adopted Long Range Transportation Plan (LRTP). The "build" scenario is based on construction of all projects identified in the LRTP while the "no-build" scenario is based on minimal construction typically comprised of safety and maintenance projects.

In August 1994, UDOT staff issued a report entitled *1993 VMT by County, City and Functional Class*, in which historic 1993 VMT is tabulated and summarized using the HPMS database. (The *1993 VMT...* report is similar to the report issued in February 1994 for 1992 VMT described in the Attainment Inventory section above.) With the benefit of this new information, the WFRC's projected 1993 VMT was replaced with HPMS' actual 1993 VMT, adjusted to average weekday traffic, in the emissions inventory. Then, in consultation with WFRC staff, the MPO's estimated VMT values for 1996, 1999, 2005 and 2015 "build" scenario were retained, while using straight-line interpolation to obtain VMT estimates for the intervening years. WFRC staff recommended using the "build" VMT rather than the "no-build" estimates, since this is consistent with their Long Range Plan for Weber County. The conversion factors and estimation methods are explained in the Technical Support Documentation for on-road mobile sources.

Again, since the HPMS does not attempt to estimate vehicle speeds, the WFRC's vehicle speeds (for all years, 1992 through 2007) also were retained.

Finally, it is important to note that CO emissions from mobile sources decline between 1992 and 2007 in spite of increasing population and increasing VMT. There are two provisions in the 1990 Clean Air Act which allow this to happen. The first is that vehicles are required to be designed to emit less CO, a provision which is phased in during vehicle model years 1994 through 1996. Second, restrictions to reduce

emissions during cold starts (approximately 20 degrees Fahrenheit) also are phased in during model years 1994 through 1996. These provisions reduce CO emissions far into the future, as newer vehicles replace older ones. Both these factors are built into the MOBILE5A model.

The MPO requested that the conformity planning cap be established at 55 Tons CO / winter week day to the year 2017 to meet transportation conformity requirements. On September 4, 1996, the Utah Air Quality Board established the conformity CO planning cap at 55 Tons CO /winter week day to the year 2017.

(II) Non-Road Emissions

(A) Trains

Growth factors for estimating future year emissions were based on employment trends reported in the Office of Planning and Budget's *State of Utah Economic & Demographic Projections 1994*. Emissions were estimated to increase at the rate of county employment growth within the Transportation, Communications, and Public Utilities segment of industry.

(B) Aircraft

The WFRC routinely reports the actual number of flights leaving and arriving at the Ogden-Hinckley Airport as recorded by the airport's control tower. Their records show actual flights from each year through 1994 plus projected flights for every fifth year through 2015. Intermediate years were interpolated between the five-year estimates. The yearly increase, or decrease, in flights became the factors used to project the yearly change in emissions. Emissions for a given year were projected from the previous year.

(C) Other Non-Road Engines

Growth factors for estimating future year emissions were based on population growth derived from the Office of Planning and Budget's *State of Utah Economic & Demographic Projections 1994*. Projected emissions were derived from the EEA 1990 Weber County study by multiplying the per-capita emissions from the use of the collective body of equipment by Ogden's human population in the projected year. The annual change in human population is reported in the publication "*State of Utah Population Projections For Cities*", prepared by the Wasatch Front Regional Council.

(2) Conformity

Technical Support Document, Volume III, tab 5,6, & 7

The Intermodal Surface Transportation and Efficiency Act (ISTEA) of 1991, as well as earlier federal highway and transit funding bills dating back to 1971, require that all federally funded highway and transit projects come from a Transportation Plan and Transportation Improvement Program. The Clean Air Act Amendments (CAAA) of 1990, as well as the ISTEA further require that in air quality nonattainment and maintenance areas a conformity analysis be performed to demonstrate that the Transportation Plan and Transportation Improvement Program conforms with the current budget established in this SIP.

In the case of maintenance plans, a September 1992, EPA memorandum, "Procedures for Processing Request to Redesignate Areas to Attainment," drafted by John Calcagni prescribes the methods which can be used to demonstrate maintenance, and in so doing also prescribes by default the methods by which emissions budgets can be developed for use in demonstrating conformity.

The Calcagni memorandum directs that a state may "demonstrate maintenance of the NAAQS by either showing that future emissions will not exceed the level of an attainment inventory, or modeling to show that the future mixes of sources and emissions rates will not cause a violation of the NAAQS." This Maintenance Plan utilizes the first of these two options. The attainment inventory method has been used to demonstrate maintenance to the year 2007 (see Section IX.C.8.f), and emission budgets for the respective source categories, including on-road mobile sources, for the years 1992 through 2007 have been taken from the projection inventories for those years and are presented in Table IX.C.42.

According to WFRC's Air Quality Memorandum Reports #7 and #8, Final Conformity Determination for the Long Range Transportation Plans and Transportation Improvement Program, the CO emissions analysis conforms to the CO emissions budget established in the CO Maintenance Plan for Ogden City. The Ogden City projected emission budget is consistent with the CO emissions summary specified in the designated horizon years documented in reports #7 and #8. This includes the MPO requirements of at least a twenty year planning horizon (23 CFR, Part 450). The CO projection of motor vehicle emissions in the maintenance plan establishes the motor vehicles emission budget beyond the attainment year to the horizon year 2017.

Conformity CO planning cap = 55.00 Tons CO/ winter week day

(3) Emissions Credit Allocation

The difference between each year's projected inventory and the 1992 attainment emissions level is called the "emissions credit" for that year. The emissions credit, or any portion of the emissions credit may be allocated to any source category contributing to the inventory; i.e., area sources, non-road mobile sources, or on-road mobile sources. The allocation of emissions credits shall be made by order of the Utah Air Quality Board and shall not be inconsistent with this plan.

Table IX.C.42

Growth Code	CALENDAR YEAR	SUMMARY TABLE: OGDEN CITY - AREA, MOBILE, AND POINT SOURCES															
		Daily CO Emissions, 1992 - 2007															
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
	Population Forecast (city)	65,954	66,976	67,999	69,021	70,043	71,066	72,088	73,111	74,133	74,802	75,470	76,139	76,807	77,476	78,145	78,813
P 1	Annual% Increase in Population (city)	0.00%	1.55%	1.53%	1.50%	1.48%	1.46%	1.44%	1.42%	1.40%	0.90%	0.89%	0.89%	0.88%	0.87%	0.86%	0.86%
	Population Forecast (county)	166,000	169,001	172,466	176,606	180,158	183,019	186,031	189,424	192,674	195,493	198,696	202,357	206,279	210,334	214,115	217,937
P 2	Annual% Increase in Population (county)	0.00%	1.8%	2.05%	2.40%	2.0%	1.59%	1.65%	1.82%	1.72%	1.46%	1.64%	1.84%	1.94%	1.97%	1.80%	1.79%
	Aviation Operations Forecast	98,473	97,925	90,030	115,000	116,000	117,000	118,000	119,000	120,000	122,000	124,000	126,000	128,000	130,000	132,000	134,000
A	Annual% Increase in Aviation	0.00%	-0.56%	-8.06%	27.74%	0.87%	0.86%	0.85%	0.85%	0.84%	1.67%	1.64%	1.6%	1.59%	1.56%	1.54%	1.52%
	Industrial Employment Forecast (county)	30,274	31,247	32,146	32,223	34,343	35,279	36,110	36,994	37,891	38,838	39,785	40,731	41,678	42,625	43,622	44,619
I	Annual% Increase in Industrial Employment (county)	0.00%	3.21%	2.88%	0.24%	6.58%	2.73%	2.36%	2.45%	2.42%	2.50%	2.44%	2.38%	2.32%	2.27%	2.34%	2.29%
	Commercial Employment Forecast (county)	41,756	43,233	45,493	47,442	49,076	50,494	51,720	53,030	54,331	55,720	57,110	58,499	59,889	61,278	62,921	64,563
C	Annual% Increase in Commercial Emplmt (county)	0.00%	3.54%	5.23%	4.28%	3.44%	2.89%	2.43%	2.53%	2.45%	2.56%	2.49%	2.43%	2.38%	2.32%	2.68%	2.61%
	TCP U Forecast (county)	2,163	2,124	2,181	2,254	2,315	2,369	2,413	2,459	2,504	2,549	2,594	2,638	2,683	2,728	2,776	2,824
T	Annual% Increase in TCP U Employment (county)	0.00%	-1.80%	2.68%	3.35%	2.71%	2.33%	1.86%	1.91%	1.83%	1.79%	1.76%	1.73%	1.70%	1.67%	1.76%	1.73%
Growth Code	AREA SOURCES	Tons/Winter Day															
		n/d	n/d														
	Orchard Heaters	n/d	n/d														
P 1	Woodburning/Fireplaces	5.50	5.48	5.57	5.65	5.74	5.82	5.90	5.99	6.07	6.13	6.18	6.24	6.29	6.34	6.40	6.45
P 1	Coal-Residential	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
C	Coal-Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I	Coal-Industrial	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16
P 1	Natural Gas-Residential	0.13	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17
C	Natural Gas-Commercial	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07
I	Natural Gas-Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P 1	Fuel Oil-Residential	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	Fuel Oil-Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I	Fuel Oil-Industrial	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
P 1	Incineration	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11
	Forest Fires	n/d	n/d														
	Firefighting Training	neg.	neg.														
P 1	Structural Fires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Prescribed/Slash/Agricultural Burning	n/d	n/d														
P 1	Open Burning	n/d	n/d														
	Detonation	n/d	n/d														
% of aircraft	Aircraft/Rocket Engine Firing & Testing	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Charcoal Grilling	n/i	n/i														
	TOTAL AREA SOURCE	5.96	5.96	6.05	6.15	6.25	6.34	6.43	6.53	6.62	6.69	6.75	6.81	6.88	6.94	7.00	7.07
Mobile 5a	ON-ROAD MOBILE	63.93	54.03	54.22	51.01	47.74	46.52	45.17	44.16	42.26	39.97	39.21	37.67	36.47	35.92	36.14	36.71
	NON-ROAD MOBILE																
A	Aircraft	0.56	0.58	0.53	0.68	0.69	0.69	0.70	0.70	0.71	0.72	0.73	0.75	0.76	0.77	0.78	0.79
T	Railroad Locomotives	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
P 1	Misc Non-Road Equipment	0.32	0.33	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.37	0.37	0.37	0.37	0.38	0.38	0.38
	TOTAL NON-ROAD MOBILE	0.93	0.96	0.91	1.07	1.08	1.09	1.11	1.12	1.13	1.15	1.16	1.18	1.19	1.21	1.23	1.24
	POINT SOURCES	n/d															
	TOTAL DAILY OGDEN CO EMISSIONS	70.82	60.95	61.19	58.23	55.07	53.95	52.71	51.81	50.01	47.80	47.12	45.66	44.54	44.07	44.37	45.02

IX.C.8.g. NEW REGULATIONS AND CONTROLS

Requirement Relating to New Emission Controls:

- *The state must ensure that it has legal authority to implement and enforce all control measures for which emissions credits are assumed in the projection inventory demonstrating maintenance of attainment. (Calcagni, "Procedures for Processing Requests to Redesignate Areas to Attainment." pp 11, September 2, 1992.)*

Section IX.C.8.b of this plan identifies emission controls that are currently in effect and that have contributed to the air quality improvements in the 1992 inventory. No additional control strategies are needed.

IX.C.8.h. CONTINGENCY MEASURES

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Requirement Relating to Contingency Measures:

- *Section 175A of the Act requires that areas seeking redesignation from nonattainment to attainment develop contingency measures that include state commitments to implement additional control measures in response to future violations of the NAAQS.*

(1) Purpose of Contingency Planning

Section 175A(d) of the Act requires that maintenance plans submitted under this section include CO control measures necessary to assure prompt action to correct any violation of the standard which occurs after the area is redesignated to attainment. The maintenance plan is to include a state commitment to implement additional CO control measures not contained in the SIP for the area before redesignation to attainment. For attainment areas, additional controls are to be implemented in response to any CO violations which may occur in the future and/or increases in CO emissions that threaten the standard after an area is redesignated to attainment. The purpose of these controls in attainment areas is to achieve sufficient CO emission reductions to eliminate any further and/or future CO violations. Implementing controls in response to CO violations in attainment areas can occur without federal redesignation of the area to nonattainment.

The State collected information based on discussions and information from industry, metropolitan planning organizations, EPA and other states regarding the magnitude of CO emission reductions from various control strategies. The effectiveness and viability of possible control measures were compared. Some controls interact with other controls thereby decreasing the overall effectiveness. Estimates of the emission reductions expected from implementation of mobile source measures have been obtained from MOBILE5A estimates where applicable. The major considerations that went into choosing the following control strategies were:

- cost effectiveness;
- easily realized reductions with minimal lead in time, and;
- overall benefit of controls.

(2) Determination of Contingency Action Level

To ensure that the CO standard is maintained in the future, the State will trigger contingency measures based on ambient CO measurements that represent exceedances of the NAAQS for CO. Contingency measures will be implemented one year after the Director of the Division of Air Quality provides written notification to the Weber-Morgan District Board of Health.

(a) Violation of the CO NAAQS in One Year

The ambient monitoring action level will be triggered on the date that either of the following conditions are met:

-The second, non-overlapping 8-hour average ambient CO measurement exceeds 9 parts per million (ppm) at a single monitoring site during one calendar year

-The second one-hour average ambient CO measurement exceeds 35 ppm at a single monitoring site during one calendar year

(b) Actions Taken if the Action Level is Exceeded

If the ambient monitoring action level is triggered, the Executive Secretary will take the following actions:

- (i) Implement the CO Contingency Measures that are included in Section IX.C.8.h(3);
- (ii) Prepare a report that outlines the recorded ambient measurements of the CO standard, and the actions that have been taken to implement contingency measures, including a schedule of future events. This report will be submitted to the EPA, and to the Air Quality Board.

(3) Contingency Measures

Because projected CO emissions through the year 2007 remain well below emissions in the attainment year of 1992 (See Table IX.C.42), the State has chosen an employer-based trip reduction (ETR) program and Basic Inspection and Maintenance Program (I/M) Improvements as the primary contingency measures. If the analysis of air quality data by the State indicates the need for further reductions, the secondary contingency measure would also be utilized. The secondary contingency measure is a 2.7% Oxygenated Gasoline Program. This Program would be activated by the State if primary contingency measures fail to produce the necessary reductions in the carbon monoxide pollution levels.

(a) Employer-Based Trip Reduction Program (ETR)

The goal of ETR Programs is to introduce and implement strategies designed to reduce the amount of measurable miles driven by employees commuting to and from work. The result would be heightened awareness of the direct relationship between driving and air pollution, and a reduction in the amount of vehicle-related pollution in Ogden City.

R307-11, an Employer-based Trip Reduction Program for federal, state, and local government agencies with 100 or more employees at a worksite, has been revised to apply to Ogden City if the CO contingency measures are triggered in Ogden City.

Based on input from the Wasatch Front Regional Council, the Division of Air Quality prepared estimates for emissions reductions that could be obtained by implementing Trip Reduction Programs with all private, federal, state, and local employees in Ogden City at worksites with 100 or more employees. Rule R307-11 currently requires government agencies with more than 100 employees to participate in the program.

The attached analysis assumes that all employers (government and private) with 100 or more employees would be formally involved in a trip reduction program, and that trip reduction would also occur on an informal basis with all other employers. (Rule 307-11 currently requires that government agencies with more than 100 employees participate in the program.) To reach the target single occupancy vehicle rates for 2015, all aspects of an employer trip reduction program are assumed to be applied including

telecommuting, increasing mode shares for transit, carpool/vanpool, and walking/bicycling. Because Ogden is a smaller urban area not experiencing the degree of congestion found in Salt Lake, because there is presently a much smaller transit mode share in Ogden, the trip reduction program is assumed to be 50 percent less effective in Ogden than in Salt Lake City.

Ogden City	2005	2015
Work Trips	56,000	63,000
Single Occupant Vehicle Rate	72.8%	68.9%
Tons Per Day Estimated Pollution Reduction	0.73	1.58

The trip reduction program target is a 10 percent decrease in the drive-alone rate. Following is a list of strategies that may be used to reduce the drive alone rate:

- A. Mass Transit
 - a. Subsidized Bus Passes
 - b. Worker Service/Express Buses
 - c. Regular Bus Service
- B. Vanpool/Carpool Programs
 - a. No-interest Vanpool Program
 - b. Vanpool Leasing Program
 - c. State Motor Vanpool (for State Employees)
 - d. Ridesharing
 - e. Shuttle Service
- C. Telecommuting
- D. Compressed Work Week/Flexible Work Schedule
- E. Worksite Parking Fees
- F. Transportation for Business-Related Activities
- G. On-Site Facility Improvement
- H. Bicycling/Walking

The State is continuing to work with the public and private sectors to ensure that all possible emission reduction strategies not being implemented at this time are being considered.

(b) Basic Inspection and Maintenance Program Improvements

The Board of Health is committed to implementing improvements to the current Basic Inspection and Maintenance Program and to supporting a state-implemented Employer-Based Trip Reduction Program to meet the requirements outlined in the CO SIP. The Board of Health, within one year of written notification by the Director of the DAQ that Ogden City has violated the air quality standards, will enact Basic I/M Improvements and support the state-implemented Employer-Based Trip Reduction Program.

The following are the improvements that would be made to the Basic I/M Program:

1. Work with the Utah State Tax Commission and Weber County Motor Vehicle Registration to develop a plan to improve the detection and elimination of the illegal registering of Weber County vehicles in other counties or out-of-state. Weber County motor vehicle registration statistics indicate that approximately 10,000 or more vehicles should be registered in Weber County than are on their current register.
2. If feasible, lower the emission level cut points that all tested vehicles would have to meet in order to pass the emissions test. This may include some deviation from the model year grouping that exists in the current program.
3. Realign the applicable tampering requirements such that vehicles model year 1984 and newer would have the tampering portion of the I/M test before they could continue with the emissions portion of the test. As the program is now designed, only vehicles model years 1990 and newer have to meet the pass/fail requirements for emission component tampering.
4. Design and implement effective technician training and certification courses to improve the ability of the technicians to correctly diagnose and repair defective automobile emissions problems. This will be accomplished by having I/M Program inspector/auditors receive certification as instructors, and working with Weber State University and Davis Area Technology Center to develop effective cost efficient, technician training courses.
5. Other Basic I/M Program Improvements as identified by Weber County and the Utah Division of Air Quality.

The Weber County Board of Health is committed to the following schedule for the implementation of improvements to the I/M program in Weber County:

Schedule

Implementation of the scheduling process begins on the date the notification letter is received from the Director of DAQ.

First month:	Modify the present Weber County I/M ordinance to include the Basic I/M Improvements listed above
Second and subsequent months:	<p>Draft ordinance submitted to County Commissioners, Division of Air Quality, Environmental Protection Agency, and released for public comments.</p> <p>Ordinance revision final</p> <p>Submit modified analyzer specification to manufacturers</p> <p>Quality assurance on analyzer software and hardware upgrades</p> <p>Technician training and implementation of improved program begins</p>
Twelfth month:	All ordinance revisions and Basic I/M Program modifications will be in place and functioning.

This schedule was adopted by the Weber-Morgan District Board of Health on April 8, 1996. A copy of this Resolution is contained in Section IX.C, App. 2.

(c) 2.7% Oxygenated Gasoline Program

If the analysis of air quality data by the State indicates the need for further reductions, the secondary contingency measure would also be utilized. The secondary contingency measure is a 2.7% Oxygenated Gasoline Program. Existing Rule R307-8 Oxygenated Gasoline Program would be activated by the State if primary contingency measures fail to produce the necessary reductions in the carbon monoxide pollution levels.

IX.C.8.i. MEASURES TO VERIFY CONTINUED CO MAINTENANCE

Requirement Relating to Verification of Continued Maintenance:

- *The maintenance plan must indicate how the state will track the progress of the Maintenance Plan.*

(1) Tracking System for Verification of Emission Inventory

Continued maintenance of the CO standard in the Ogden City nonattainment area depends in large measure upon the ability of the state to track CO emissions in future years. Consequently, the State will perform the following to verify maintenance:

- (a) Every three years after the CO Maintenance Plan is approved by EPA, the State will submit tri-annual CO emission inventories to EPA by October 1st of the following year. These tri-annual inventories will follow the same procedures used to develop the 1992 attainment emission inventory, by applying the Inventory Preparation Plan and Quality Assurance Checklist. The tri-annual emission inventories will be based on the most current VMT data, actual point source emissions, and area source emissions founded on the most current population and industry growth information. This submittal will also include summary tables and graphs of CO comparing projected emissions with actual emissions. If there are major inconsistencies between the projections and actual emission calculations, the Division will analyze the discrepancies and initiate steps to try to correct the problems before the next CO season. As committed to earlier under section IX.C.8.h(2)(ii)(B), the State will submit copies of the analyses and corrective action to EPA.
- (b) Projects will be coordinated between the Compliance Section, the Toxics Program, and the Planning Branch in DAQ to obtain more accurate information on area sources, and to update the yearly emission inventories to reflect the most recent emissions obtained from these sources. The Compliance Section would report any area sources which were found that were not part of the inventory at the time the maintenance plan was approved.
- (c) The permitting efforts of the Operating Permit Program will be coordinated with the Planning Branch. Inspectors and emission inventory personnel will monitor sources to verify all major point source emissions, as well as a percentage of area source emissions reported in the emission inventory and/or their operating permits.
- (d) All approval order/notice of intent projects will be coordinated between the Permitting Branch and the Planning Branch. By using the comprehensive project tracking system, the Planning Branch will be informed of all notices of intent that have been submitted, new sources that receive approval orders, and sources that fall below the de minimis limit for approval orders. This tracking system will reveal estimated emissions and modifications that should be tracked and reflected in the emission inventory for the Ogden City area.

(2) Analyze Ambient CO Monitoring Data

The State will analyze the ambient CO monitoring data with respect to the level of the CO standard and log the data into the AIRS database. Exceedences of the standard will be reported to EPA.

(3) Annual Review of the CO Monitoring Network

The State will continue to evaluate the ambient CO monitoring network to ensure that the network meets all applicable federal regulations and guidelines. The results of this evaluation will be submitted to EPA by June 1st of each year in the annual Network Review.

(4) Provisions for Revising the Maintenance Plan

The State will revise the Plan as necessary in response to revisions of the national primary ambient CO standard, or to take advantage of improved or more expeditious methods of maintaining the standard. The State will also revise the Plan as necessary to comply with the EPA's finding that the Plan is inadequate to attain or maintain the national ambient standard, or every eight years in compliance with Section 175A of the Act.

(5) Provision for Prohibiting Emissions That Interfere With Attainment In Other States

The State will take steps as necessary to prohibit emissions within the state that have been shown to interfere with attainment or maintenance of a NAAQS in another state.